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Hospital mortality after arthroplasty using a cemented stem for displaced femoral neck fractures

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ABSTRACT

Purpose. To review hospital mortality after hemiarthroplasty or total hip arthroplasty (THA) using a cemented stem for displaced femoral neck fractures.
Methods. Medical records of 284 hips in 70 men and 209 women aged 45 to 106 (mean, 81.3) years who underwent hemiarthroplasty (n=232) or THA (n=52) with a cemented stem using third-generation cementing techniques (including use of a plug, lavage, and cement pressurisation) for displaced femoral neck fractures were retrospectively reviewed. According to the American Society of Anesthesiologists (ASA) grading, 6 patients were classified preoperatively as grade 1, 77 as grade 2, 148 as grade 3, 47 as grade 4, and one as grade 5. Patients were operated on within 48 hours. Patients were rehabilitated in the hospital until discharge. The primary outcome measure was hospital mortality, including the cause of death.

Results. The mean length of hospital stay was 9.2 (standard deviation, 4.1) days. The hospital mortality was 5.7% (n=16). Of the 16 patients who died, 3 were classified preoperatively as ASA grade 2, 6 as grade 3, and 7 as grade 4. One patient died during the operation. One patient died in the recovery room within 6 hours. Both died from a cardiac arrest and were classified as ASA grade 4. Six patients died within the first 5 days. The causes of death were aspiration pneumonia (n=5), cardiac arrest (n=3), bowel perforation (n=2), multiple organ failure (n=3), type 2 respiratory failure (n=1), heart failure (n=1), and subarachnoid bleeding after a hospital fall (n=1).
Conclusion. Hemiarthroplasty or THA using a cemented stem resulted in low hospital mortality in our hospital dedicated to the treatment of geriatric hip fractures. Hospital mortality was higher in patients with ASA grade 3 or higher.

Key words: *arthroplasty; femoral neck fractures; hospital mortality*

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INTRODUCTION

Femoral neck fractures in the elderly are associated with high morbidity and mortality.[1] The optimal treatment remains controversial.[2–4] For displaced femoral neck fractures, hemiarthroplasty and total hip arthroplasty (THA) achieve better functional outcome and fewer revision surgeries than internal fixation.[5] Nonetheless, there is no consensus for the use of a cemented or uncemented femoral stem.[2–4,6–14] Cemented femoral stems result in a better functional outcome and less pain than uncemented femoral stems, with no increased mortality at one month or one year.[5,8,13] Historically, fixation with acrylic bone cement has been associated with increased mortality.[15,16] However, most relevant studies had bias in patient selection, as cemented stems were not used in patients with severe cardiac or pulmonary comorbidities. Furthermore, patients with severe cardiopulmonary illness were excluded from fixation with a cemented stem.[3,6,8] In our hospital dedicated to the treatment of geriatric hip fractures, only cemented stems are used for hemiarthroplasty and THA. This study reviewed hospital mortality after hemiarthroplasty or THA using a cemented stem for displaced femoral neck fractures in 279 patients.

MATERIALS AND METHODS

This study was approved by the Human Research Ethics Committee of our hospital. Medical records of 284 hips in 70 men and 209 women aged 45 to 106 (mean, 81.3) years who underwent hemiarthroplasty (n=232) or THA (n=52) with a cemented stem using third-generation cementing techniques (including use of a plug, lavage, and cement pressurisation) for displaced femoral neck fractures between April 2010 and December 2011 were retrospectively reviewed. According to the American Society of Anesthesiologists (ASA) grading, 6 patients were classified preoperatively as grade 1, 77 as grade 2, 148 as grade 3, 47 as grade 4, and one as grade 5. Patients were operated on within 48 hours by a consultant surgeon or registrars under the supervision of a consultant. Patients were rehabilitated in the hospital until discharge. The primary outcome measure was hospital mortality, including the cause of death.

RESULTS

The mean length of hospital stay was 9.2 (standard deviation, 4.1) days. The hospital mortality was 5.7% (n=16). Of the 16 patients who died, 3 were classified preoperatively as ASA grade 2, 6 as grade 3, and 7 as grade 4. One patient died during the operation. One patient died in the recovery room within 6 hours. Both died from a cardiac arrest and were classified as ASA grade 4. Six patients died within the first 5 days. The causes of death were aspiration pneumonia (n=5), cardiac arrest (n=3), bowel perforation (n=2), multiple organ failure (n=3), type 2 respiratory failure (n=1), heart failure (n=1), and subarachnoid bleeding after a hospital fall (n=1).

DISCUSSION

In a British registry study of 16 496 patients who underwent hemiarthroplasty or THA, hospital mortality was 8.4% and 5.8% when uncemented and cemented stems were used, respectively.[14] However, baseline characteristics of patients differed between the 2 groups, as the cemented stems were reserved for younger and more active patients.[14] In a Norwegian registry study comparing the use of cemented versus uncemented stems in patients aged >70 years, one-year mortality was 25.6% and 26.5%, respectively.[10] Compared with cemented hips, uncemented hips had an increased risk of revision of 2.1 times, but had lower rates of intra-operative death (0.3% vs. 0.04%) and peri-operative complications (4.6% vs. 3.5%). In an Australian registry study of 25 739 hemiarthroplasties, compared with uncemented stems, cemented stems had an increased hazard ratio for risk of death on postoperative day 1, but this trend was reversed after one week ($p=0.02$), one month ($p=0.028$), and one year ($p<0.0001$).13 Respectively for cemented and uncemented stems, mortality was 2.6% and 3.0% after one week, 6.6% and 9.1% after one month, and 20.7% and 29.6% after one year.[13] Cemented hemiarthroplasty was the safer treatment option at all time points after the day of surgery.[13] However, there may have been bias in patient selection for these treatments, and comorbidities were not recorded.[13] Systematic reviews have reported comparable outcomes between cemented and uncemented hemiarthroplasty in terms of

mortality, complications, pain, and function.[4,7,17] In a randomised trial comparing cemented and uncemented hemiarthroplasties, implant-related complications were significantly higher after uncemented hemiarthroplasty among elderly patients without any cardiovascular comorbidity.[3] There was a trend to better mobility and function after cemented hemiarthroplasty.[3] However, almost 50% of eligible patients were excluded because they were considered unfit by the anaesthetist to undergo cementation.[3]

A limitation of this study in terms of the generalisability was that all patients were treated in a dedicated geriatric hip fracture unit and thus mortality was low. Patients generally stayed in hospital longer for rehabilitation and were not discharged early to other rehabilitation facilities, and thus more hospital mortality may have been captured.

CONCLUSION

Hemiarthroplasty or THA using a cemented stem resulted in low hospital mortality in our hospital dedicated to the treatment of geriatric hip fractures. Hospital mortality was higher in patients with ASA grade 3 or higher.

DISCLOSURE

No conflicts of interest were declared by the authors.

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